SALT AS A SUSTAINABLE BUILDING MATERIAL USING ADDITIVE MANUFACTURING METHODS

By
Deena Mohamed El-Mahdy Ahmed Hassanin

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirements for the Degree of
DOCTOR OF PHILOSOPHY
in
Architectural Engineering

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Under the Supervision of

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Title of Thesis:

SALT AS A SUSTAINABLE BUILDING MATERIAL USING ADDITIVE MANUFACTURING METHODS

Key Words:
Traditional building materials and techniques, Additive Manufacturing and Digital, Fabrication Techniques, Computational Design, Biomimicry and organism behavior, Material behavior.

Summary:

In a context that has been largely shaped by standardization and mass production due to the fast speed of technology in our digital age, the main issue of global concern about the lack of energy and resources. The main aim of the research is to explore salt -sodium chloride- as a local building material differently through new additive manufacturing techniques (such as a 3D printer) in terms of achieving and producing sustainable efficient and low-cost -composite natural unit. The ultimate aim is to reach a fabrication assembly prototype mockup to form a structural panel to test the structure and connections. The AM process would allow the possibility to generate low cost self-built housing solutions on-site, based on the consideration of material through the design process, which is not only connected with the design product but the process itself.

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To all I say thank you.

Deena El-Mahdy - 2018

DEDEICATION

Thanks to Allah who gave me the power to do this research.
"God raises those of you who believe and those who were seeking knowledge"

{يَرْفَعِ اللَّهُ الَّذِينَ آمَنُوا مِنكُمْ وَالَّذِينَ أُوتُوا الْعِلْمَ دَرَجَاتٍ }

{وَقُلِ اعْمَلُوا فَسَيَرَى اللَّهُ عَمَلَكُمْ وَرَسُولُهُ وَالْمُؤْمِنُونَ}

{وَفَوْقَ كُلِّ ذِي عِلْمٍ عَلِيمٌ}

{وَمَا أُوتِيتُمْ مِنَ الْعِلْمِ إِلَّا قَلِيلاً}

I dedicate this Thesis……
To my wonderful parents who encouraged me to work hard to achieve my dreams,
To my professors who taught me to have faith in myself and always to do my best,
To my professor and the great mentor, Ahmed Mito, may Allah bless his soul,
To my lovely students who helped me in a way or other,
To the researchers who may make this a difference in their life.

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